

100

FIG. 1

| Source Local Address | Protocol | Source Port | Source Address Domain | Destination Address Domain | Translated Source Port | Source Global Address |
|----------------------|----------|-------------|-----------------------|----------------------------|------------------------|-----------------------|
| A (host X) | | | 1 | 2 | | A12 |
| A (host X) | | | 1 | 3 | | A13 |
| A (host X) | | | 1 | 4 | | A14 |

202

204

206

FIG. 2A

| Source Local Address | Protocol | Source Port | Source Address Domain | Destination Address Domain | Translated Source Port | Source Global Address |
|----------------------|----------|-------------|-----------------------|----------------------------|------------------------|-----------------------|
| A (host Y) | | | 2 | 1 | | A21 |
| A (host Y) | | | 2 | 3 | | A23 |
| A (host Y) | | | 2 | 4 | | A24 |

208

210

212

FIG. 2B

| Source Local Address | Protocol | Source Port | Source Address Domain | Destination Address Domain | Translated Source Port | Source Global Address |
|----------------------|----------|-------------|-----------------------|----------------------------|------------------------|-----------------------|
| A (host Z) | | | 3 | 1 | | A31 |
| A (host Z) | | | 3 | 2 | | A32 |
| A (host Z) | | | 3 | 4 | | A34 |

214

216

218

FIG. 2C

| Destination Global Address | Protocol | Translated Destination Port | Source Address Domain | Destination Address Domain | Destination Port | Destination Local Address |
|----------------------------------|----------|-----------------------------------|-----------------------------|----------------------------------|---------------------|---------------------------------|
| A12 | | | 2 | 1 | | A (hostX) |
| A13 | | | 3 | 1 | | A (hostX) |
| A14 | | | 4 | 1 | | A (hostX) |
| A21 | | | 1 | 2 | | A (hostY) |
| A23 | | | 3 | 2 | | A (hostY) |
| A24 | | | 4 | 2 | | A (hostY) |
| A31 | | | 1 | 3 | | A (hostZ) |
| A32 | | | 2 | 3 | | A (hostZ) |
| A34 | | | 4 | 3 | | A (hostZ) |
| B | | | 0 | 4 | | B |

FIG. 2D

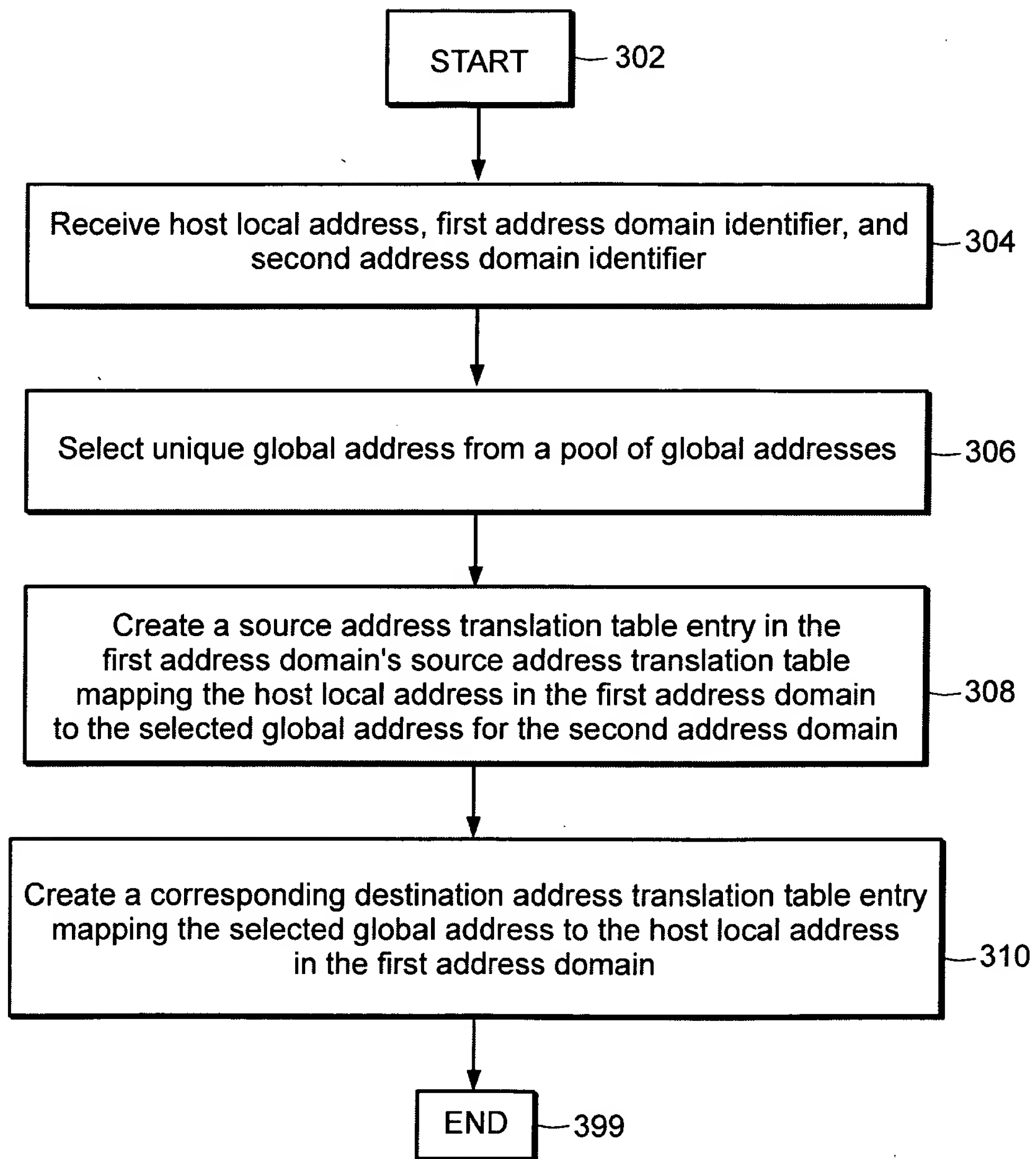


FIG. 3

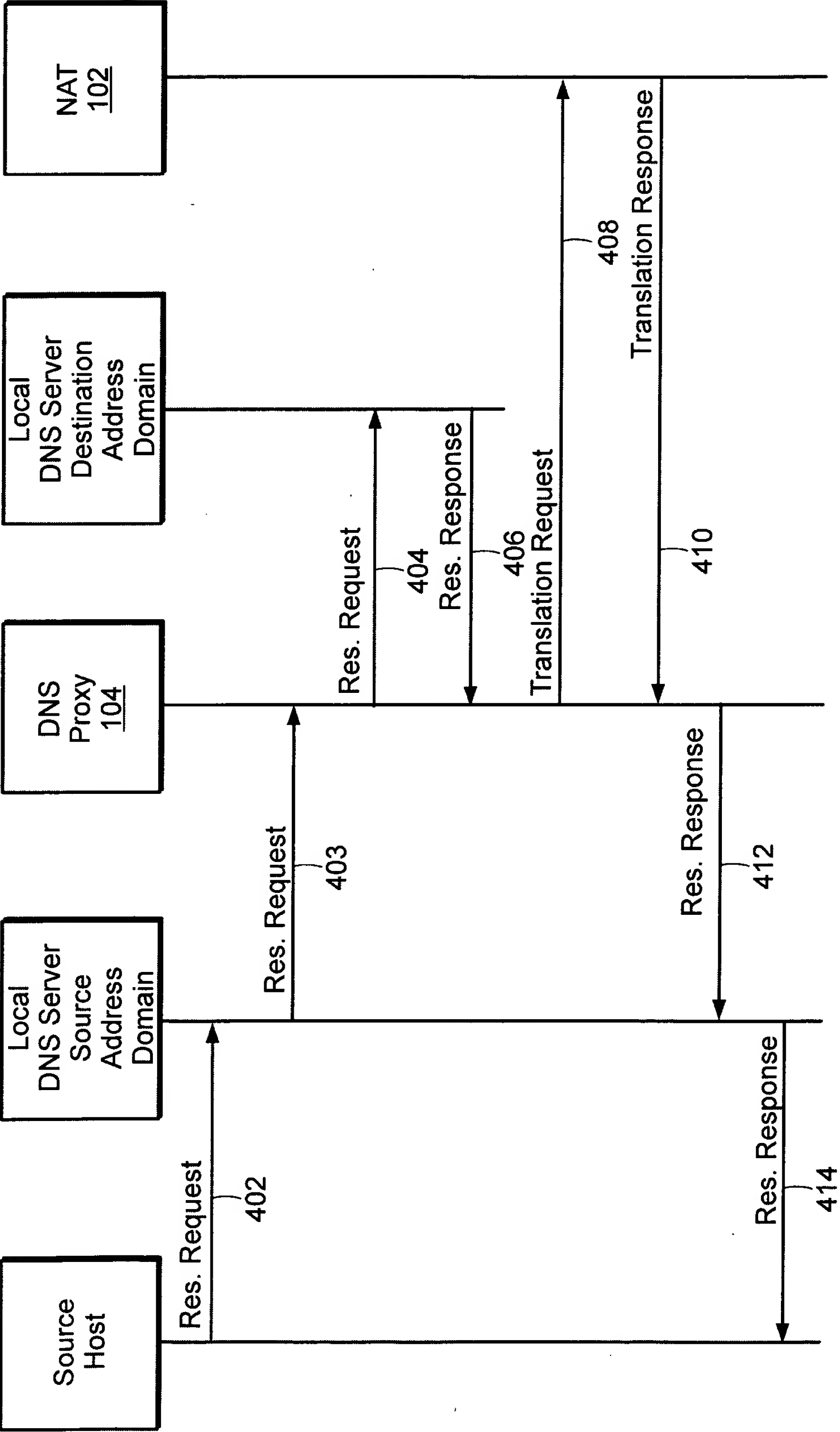


FIG. 4

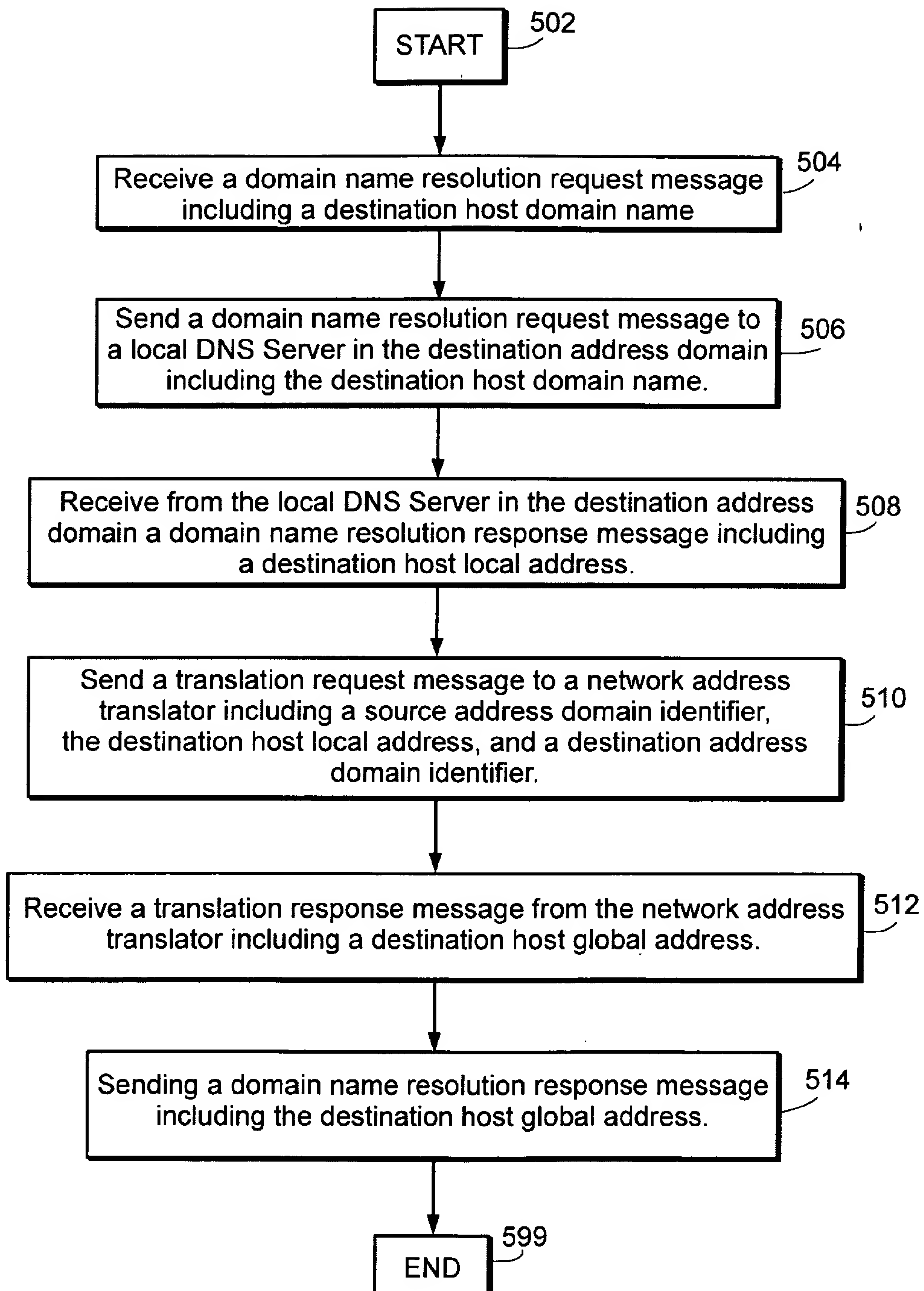


FIG. 5

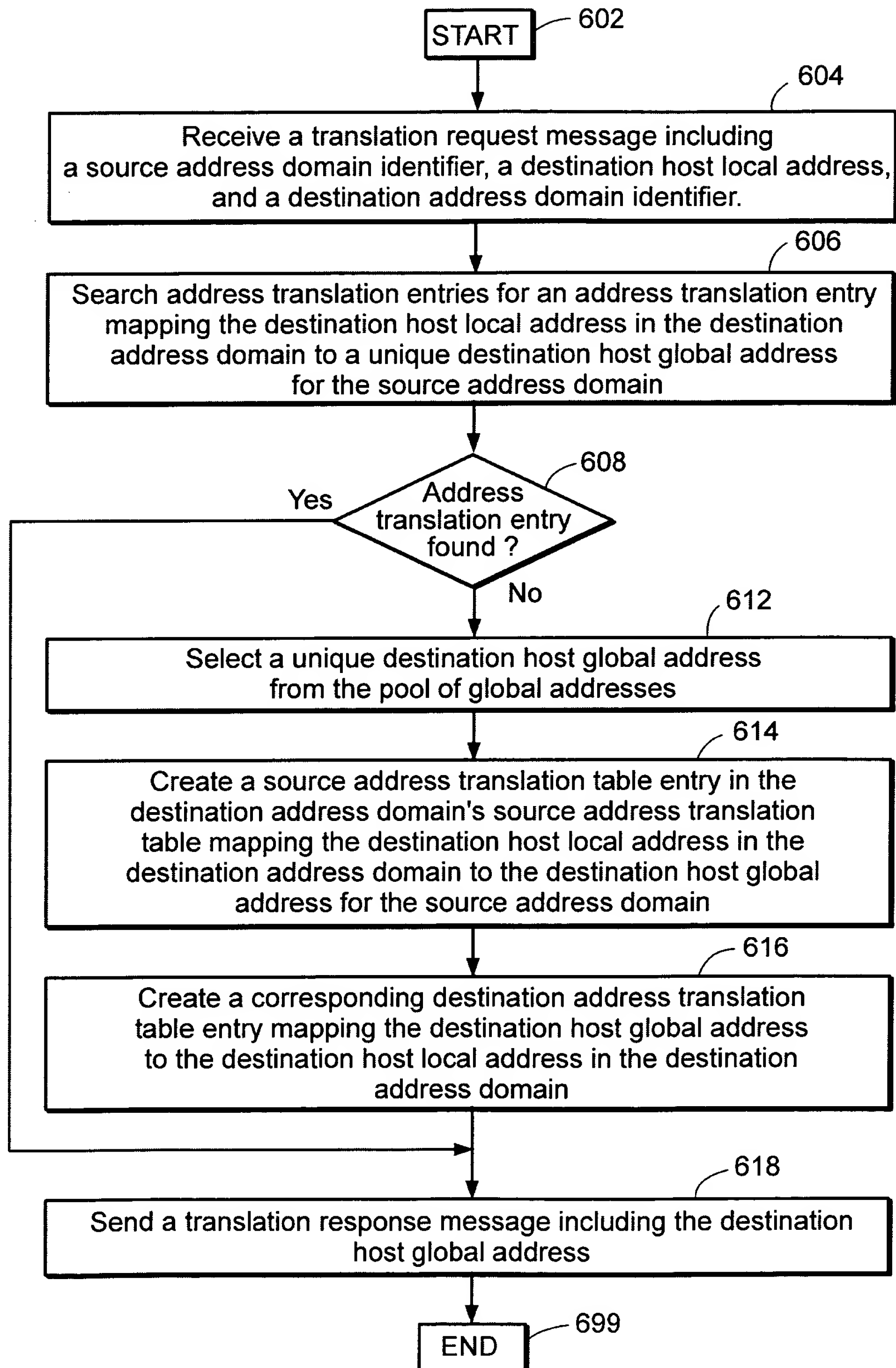


FIG. 6

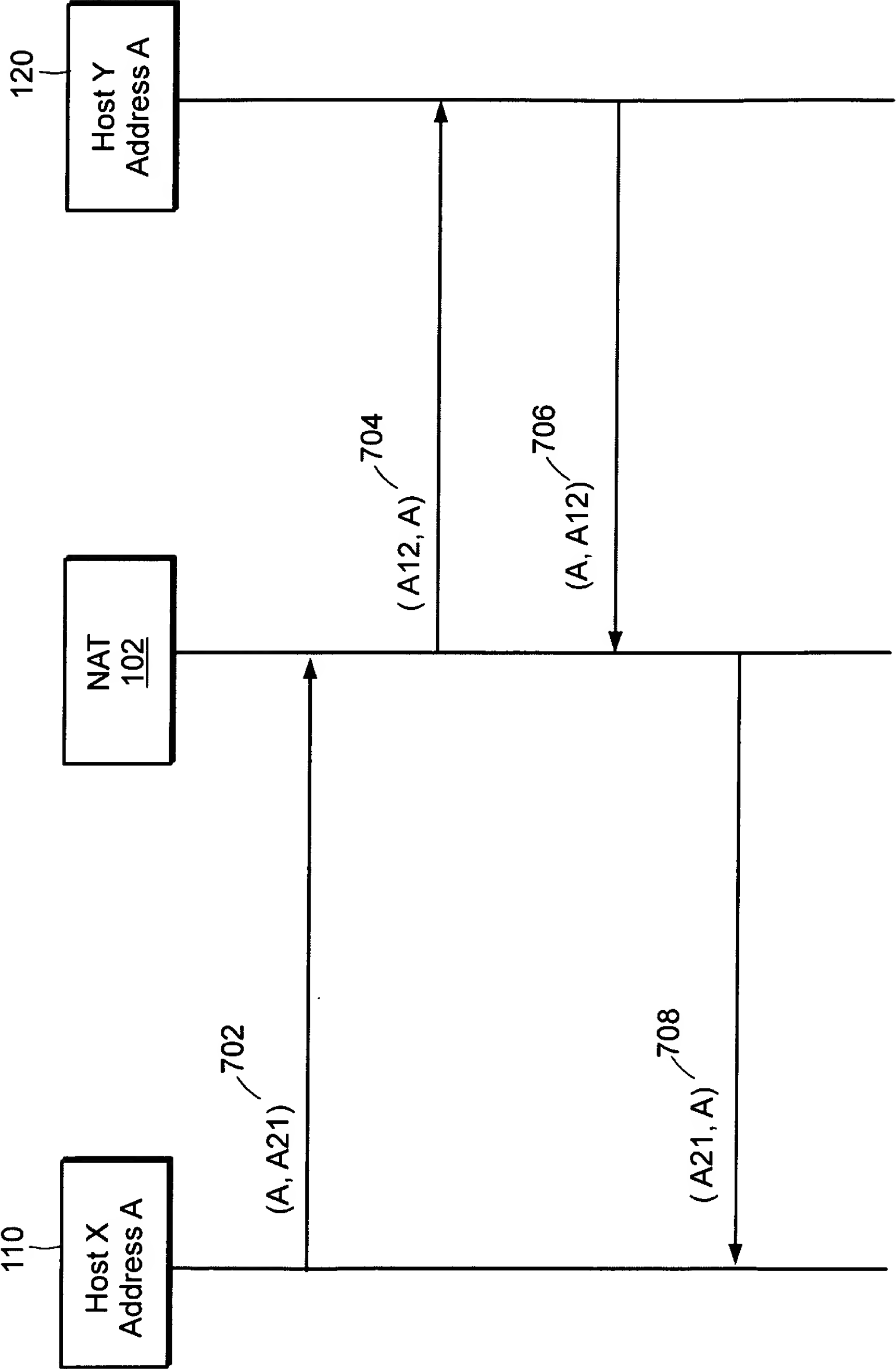


FIG. 7

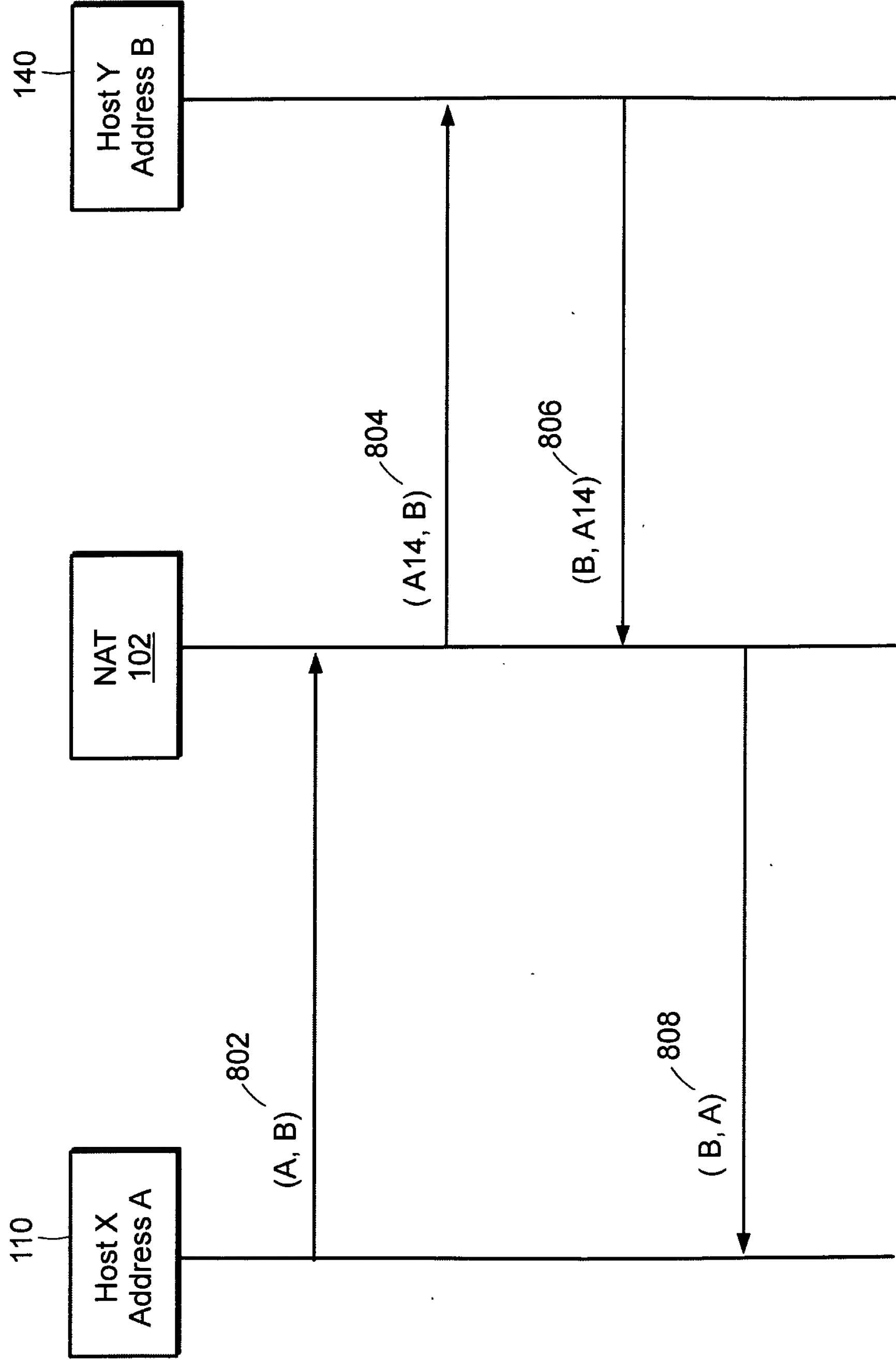


FIG. 8

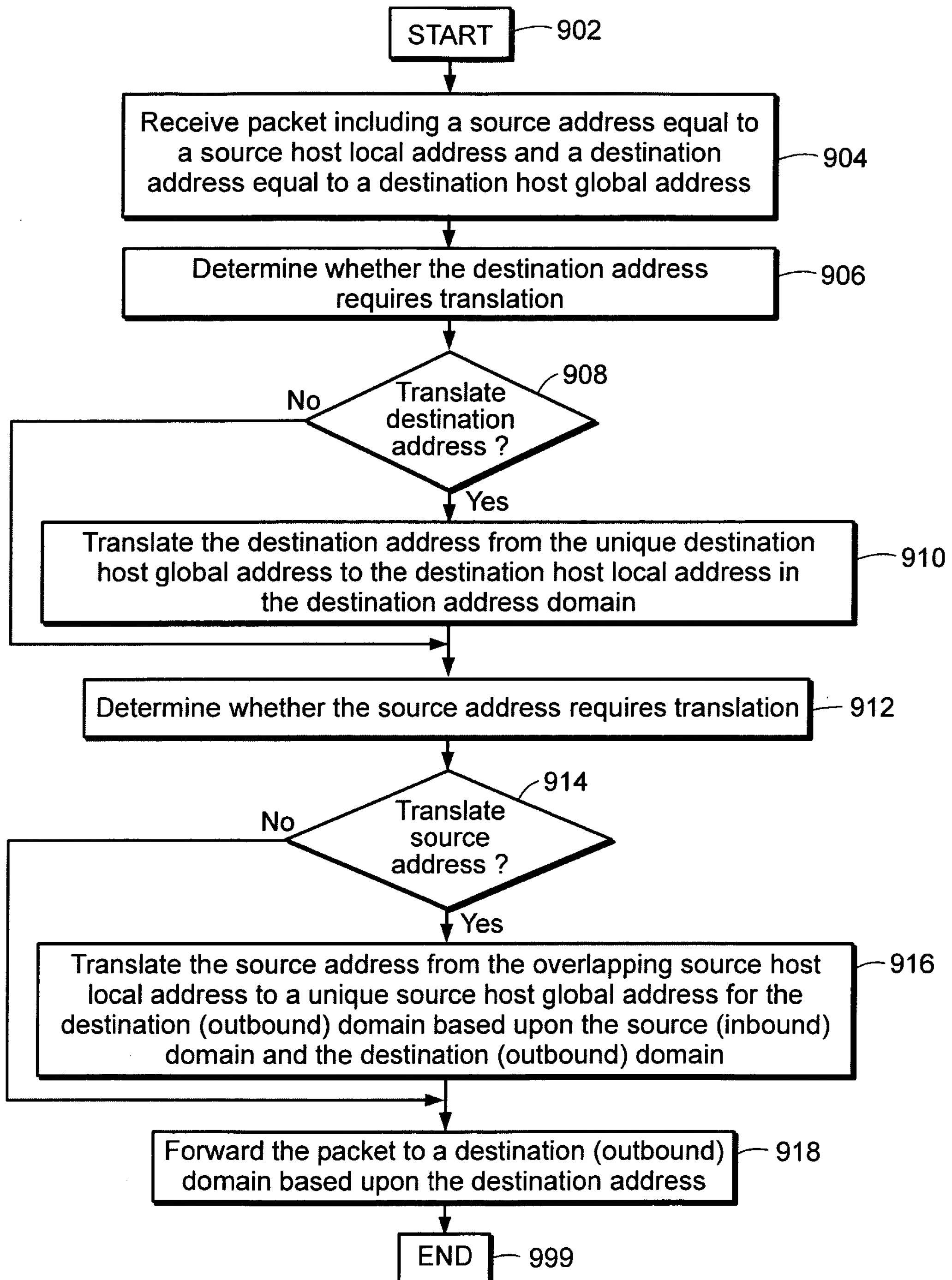


FIG. 9

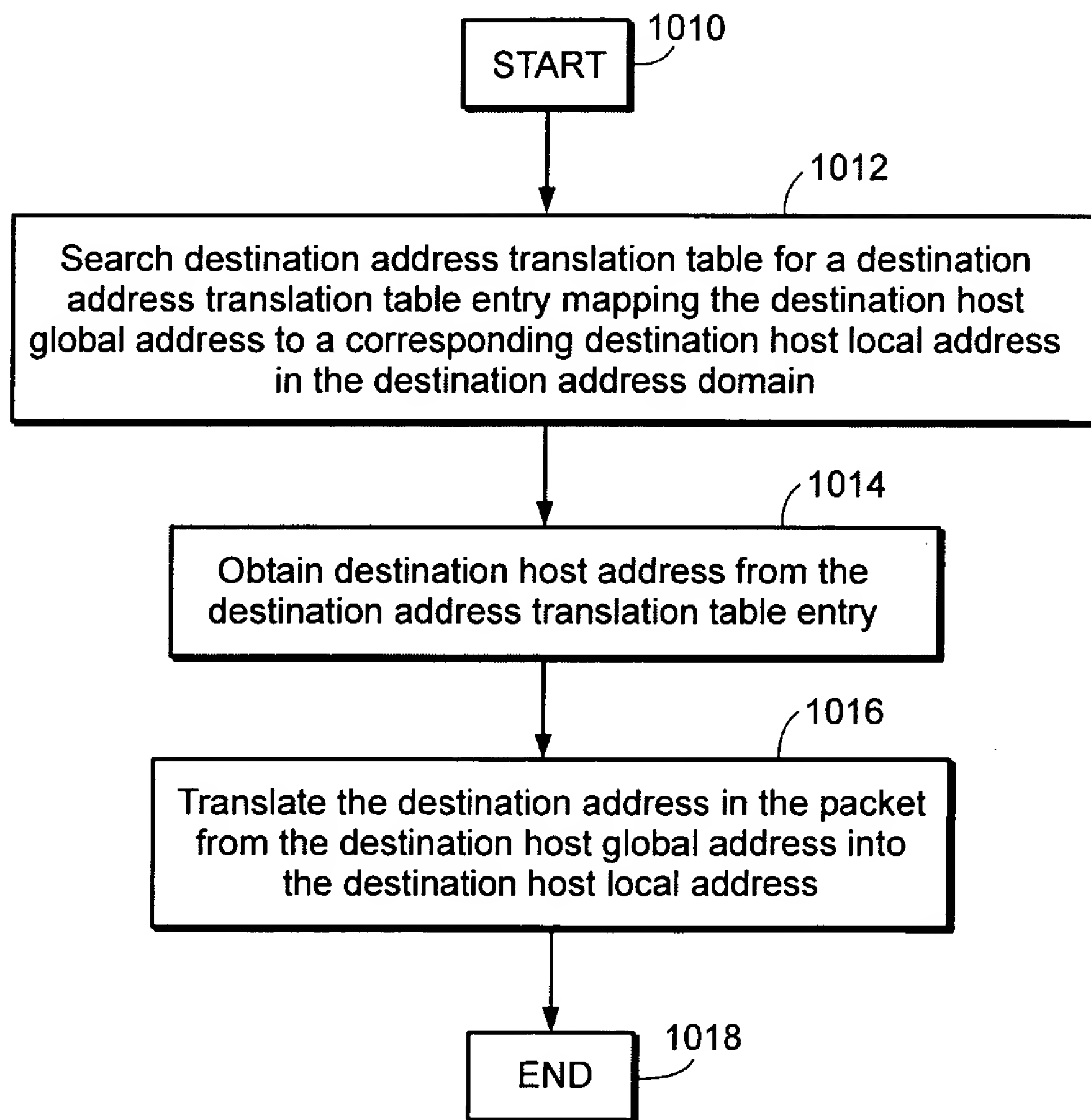
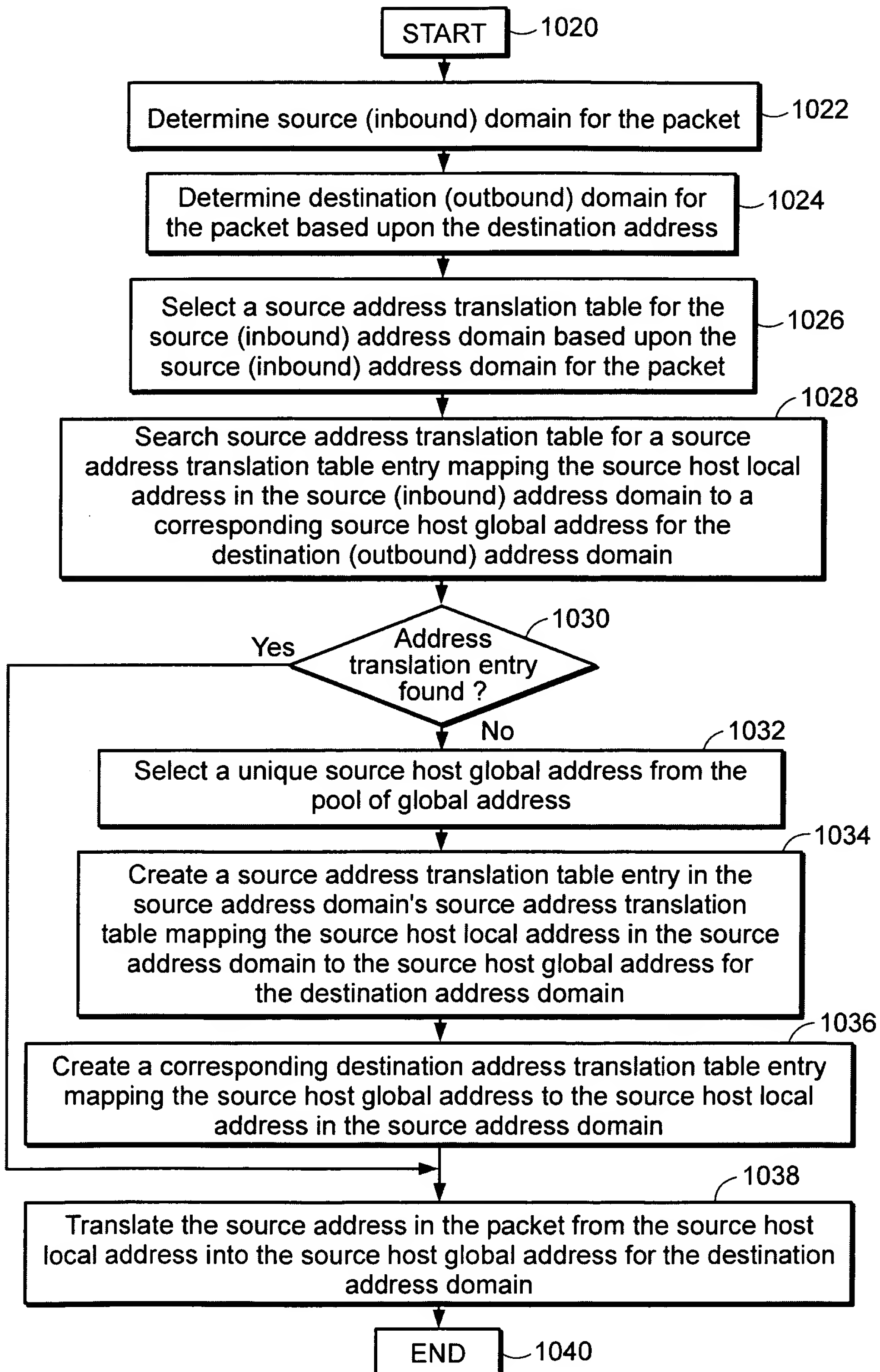
910

FIG. 10A

12/38



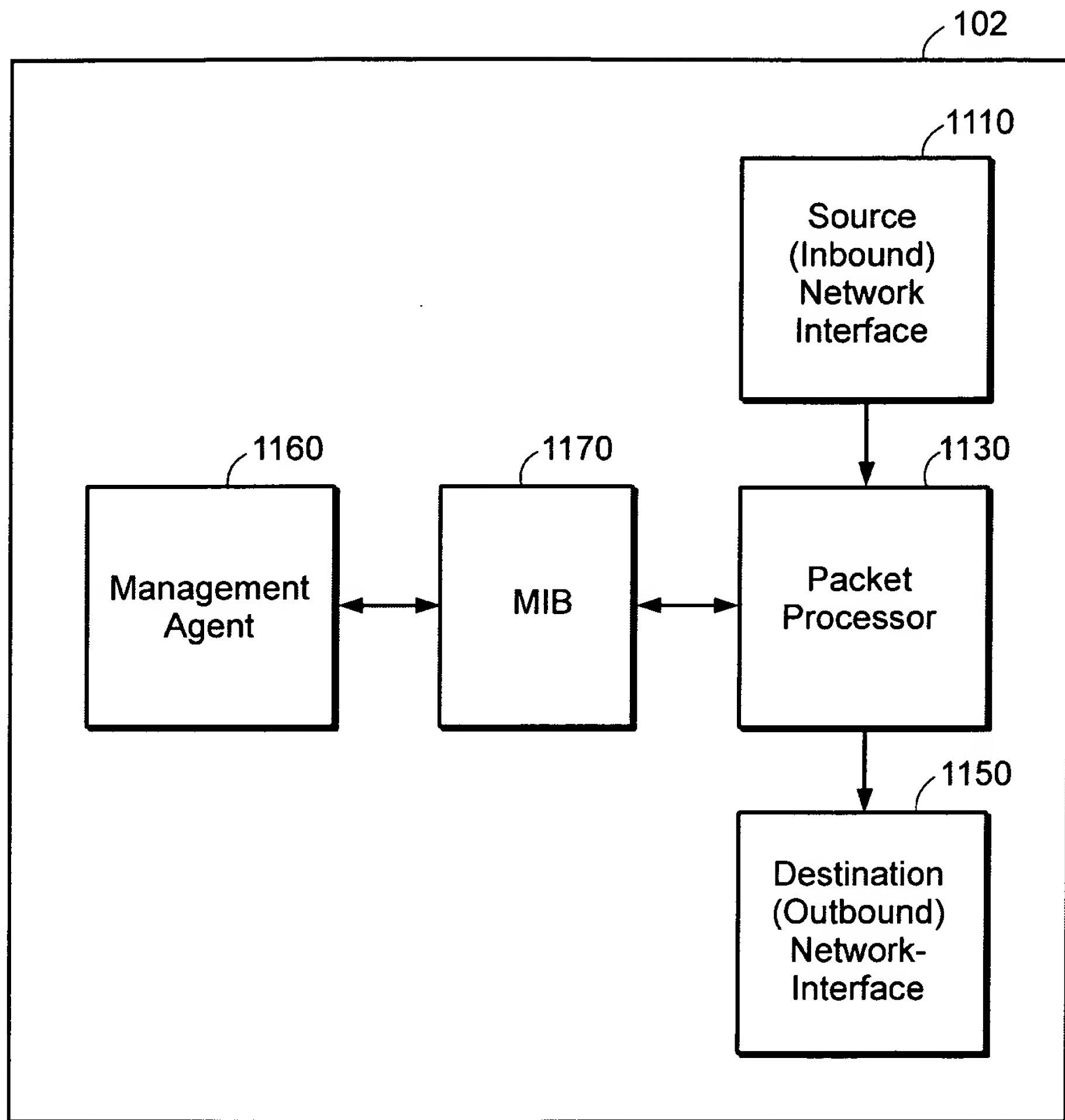


FIG. 11A

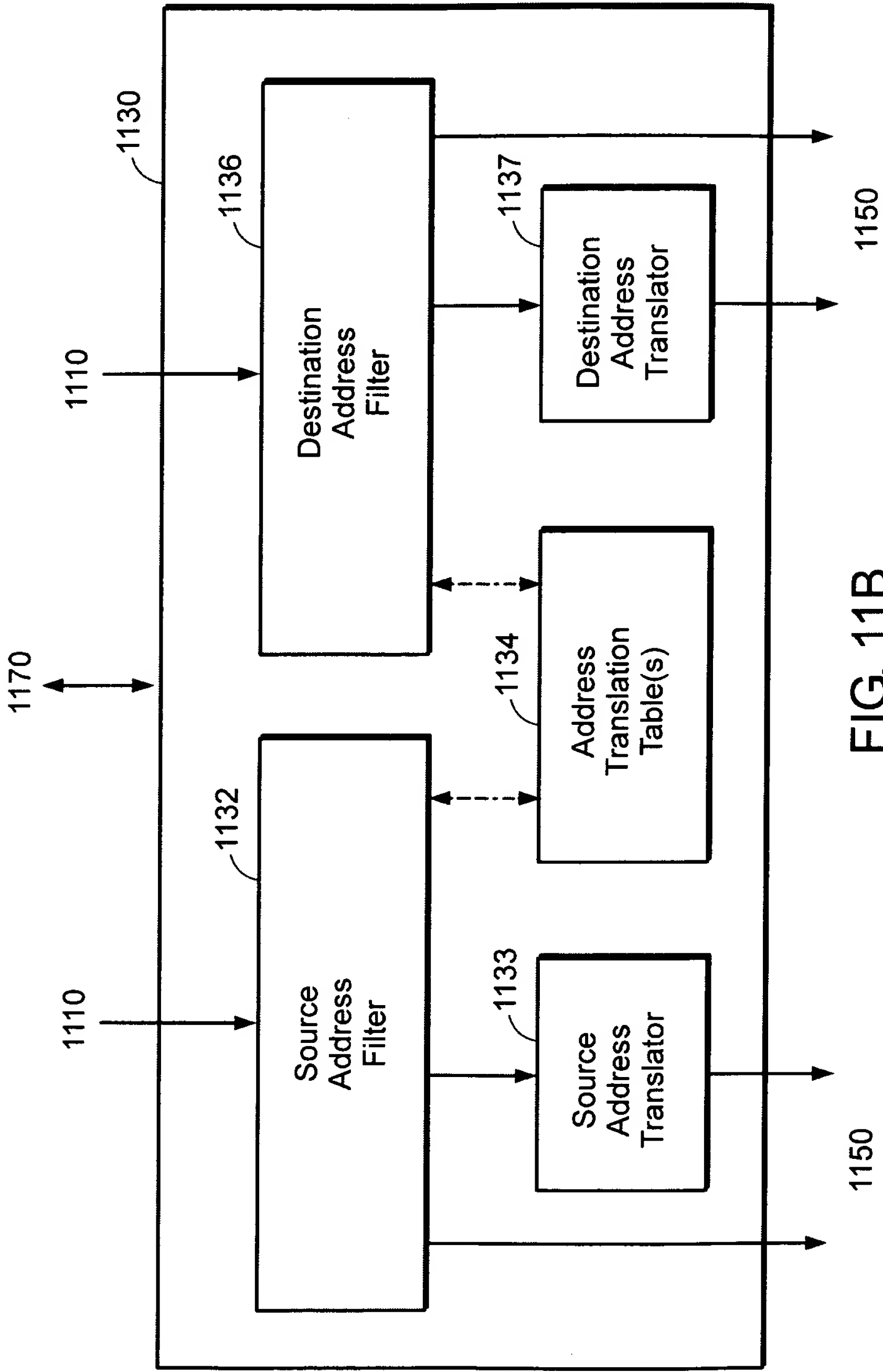


FIG. 11B

```
Wellfleet-NAT-MIB DEFINITIONS ::= BEGIN
```

```
--
```

```
IMPORTS
```

```
    IpAddress, Counter, Gauge
```

```
    FROM RFC1155-SMI
```

```
OBJECT-TYPE
```

```
    FROM RFC-1212
```

```
DisplayString
```

```
    FROM RFC1213-MIB
```

```
wfNatGroup
```

```
    FROM Wellfleet-COMMON-MIB;
```

```
wfNatIfTable OBJECT-TYPE
```

```
    SYNTAX SEQUENCE OF WfNatIfEntry
```

```
    ACCESS not-accessible
```

```
    STATUS mandatory
```

```
    DESCRIPTION
```

```
        "The set of interface that are participating  
        in the NAT protocol."
```

```
    ::= { wfNatGroup 6 }
```

```
wfNatIfEntry OBJECT-TYPE
```

```
    SYNTAX WfNatIfEntry
```

```
    ACCESS not-accessible
```

```
    STATUS mandatory
```

```
    DESCRIPTION
```

```
        "An single instance of a NAT interface entry."
```

```
    INDEX { wfNatIfIpAddress,  
           wfNatIfCircuit }
```

```
    ::= { wfNatIfTable 1 }
```

FIG. 12A

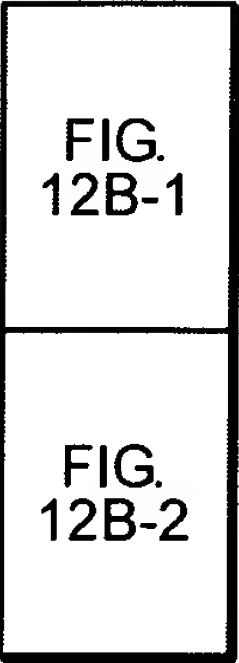


FIG.
12B-1

FIG.
12B-2

FIG. 12B

```
WfNatIfEntry ::= SEQUENCE {  
    wfNatIfDelete  
        INTEGER,  
    wfNatIfDisable  
        INTEGER,  
    wfNatIfIpAddress  
        IpAddress,  
    wfNatIfCircuit  
        INTEGER,  
    wfNatIfType  
        INTEGER,  
    wfNatIfState  
        INTEGER,  
    wfNatIfTxCount  
        Counter,  
    wfNatIfRxCount  
        Counter,  
    wfNatIfPktDropCount  
        Counter,  
    wfNatIfDomain  
        DisplayString  
}
```

FIG. 12B-1

wfNatIfDelete OBJECT-TYPE

SYNTAX INTEGER {
 created(1),
 deleted(2)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This variable determines in a NAT Interface has been configured on the router."

DEFVAL { created }

::= { wfNatIfEntry 1 }

wfNatIfDisable OBJECT-TYPE

SYNTAX INTEGER {
 enabled(1),
 disabled(2)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"The NAT interface's administrative status. The value 'enabled' denotes that NAT has been configured on the interface. The value 'disabled' denotes that the interface is not running NAT."

DEFVAL { enabled }

::= { wfNatIfEntry 2 }

FIG. 12B-2

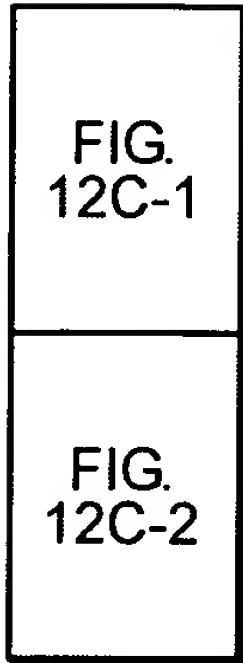


FIG.
12C-1

FIG.
12C-2

FIG. 12C

wfNatIfIpAddress OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The IP address of this NAT interface."

::= { wfNatIfEntry 3 }

wfNatIfCircuit OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"The circuit number of this interface."

::= { wfNatIfEntry 4 }

wfNatIfType OBJECT-TYPE

SYNTAX INTEGER {
 uniDirInbound(1),
 uniDirOutbound(2),
 biDirectional(3)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Denotes the type of NAT interface being defined."

DEFVAL{ uniDirInbound }

::= { wfNatIfEntry 5 }

FIG. 12C-1

```

wfNatIfState OBJECT-TYPE
    SYNTAX  INTEGER {
        up(1),
        down(2),
        init(3)
    }
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "The state of NAT on this interface"
    DEFVAL  { down }
    ::= { wfNatIfEntry 6 }

wfNatIfTxCount OBJECT-TYPE
    SYNTAX  Counter
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "Number of packets mapped over this interface from
        the local to the global network."
    ::= { wfNatIfEntry 7 }

```

FIG. 12C-2

wfNatIfRxCount OBJECT-TYPE

SYNTAX Counter

ACCESS read-only

STATUS mandatory

DESCRIPTION

"Number of packets mapped over this interface from
the global to the local network."

::= { wfNatIfEntry 8 }

wfNatIfPktDropCount OBJECT-TYPE

SYNTAX Counter

ACCESS read-only

STATUS mandatory

DESCRIPTION

"Number of packets dropped on this interface"

::= { wfNatIfEntry 9 }

wfNatIfDomain OBJECT-TYPE

SYNTAX DisplayString

ACCESS read-write

STATUS mandatory

DESCRIPTION

"When wfNatIfType is set to biDirectional, specifies
the Address Domain Name that this interface is
connected to, otherwise set to null."

::= { wfNatIfEntry 10 }

FIG. 12D

wfNatAddressRangeTable OBJECT-TYPE

SYNTAX SEQUENCE OF WfNatAddressRangeEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"Table of address ranges. "

::= { wfNatGroup 8 }

wfNatAddressRangeEntry OBJECT-TYPE

SYNTAX WfNatAddressRangeEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"Information describing each of the available address ranges."

INDEX { wfNatAddressRangeAddress,
wfNatAddressRangePrefixLen,
wfNatAddressRangeIndex}

::= { wfNatAddressRangeTable 1 }

WfNatAddressRangeEntry ::= SEQUENCE {

wfNatAddressRangeDelete

INTEGER,

wfNatAddressRangeDisable

INTEGER,

wfNatAddressRangeAddress

IpAddress,

wfNatAddressRangePrefixLen

INTEGER,

wfNatAddressRangeIndex

INTEGER,

wfNatAddressRangeNto1Addr

IpAddress,

wfNatAddressRangeType

INTEGER,

wfNatAddressRangeDomain

DisplayString,

wfNatAddressRangeTransPool

INTEGER,

wfNatAddressRangeStaticNextHop

IpAddress,

wfNatAddressRangeUnnumCct

INTEGER

}

FIG. 12E

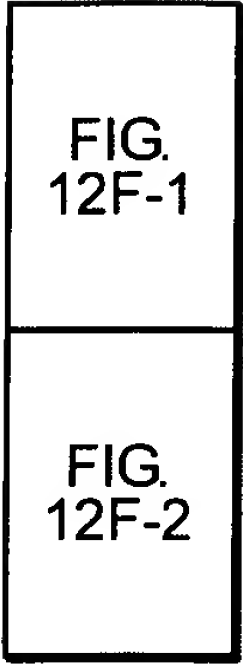


FIG.
12F-1

FIG.
12F-2

FIG. 12F

wfNatAddressRangeDelete OBJECT-TYPE

SYNTAX INTEGER {

created(1),

deleted(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Create/Delete parameter. Default is created. Users perform
a set operation on this object in order to create/delete
an address range entry."

DEFVAL { created }

::= { wfNatAddressRangeEntry 1 }

wfNatAddressRangeDisable OBJECT-TYPE

SYNTAX INTEGER {

enabled(1),

disabled(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Enable/Disable parameter. Default is enabled. Users perform
a set operation on this object in order to enable/disable
an address range entry."

DEFVAL { enabled }

::= { wfNatAddressRangeEntry 2 }

FIG. 12F-1

wfNatAddressRangeAddress OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The IP beginning address of this range entry."

::= { wfNatAddressRangeEntry 3 }

wfNatAddressRangePrefixLen OBJECT-TYPE

SYNTAX INTEGER (1 .. 32)

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The number of contiguous bits set in the IP address mask
which are used to define the address range of the entry."

::= { wfNatAddressRangeEntry 4 }

wfNatAddressRangeIndex OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-only

STATUS mandatory

DESCRIPTION

"A unique value for this entry in wfNatAddressRangeTable."

::= { wfNatAddressRangeEntry 5 }

FIG. 12F-2

wfNatAddressRangeNto1Addr OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-write

STATUS mandatory

DESCRIPTION

"When wfNatAddressRangeType is set to srcAddrFilter, specifies the N-to-1 translation address used for this range, otherwise set to zero."

DEFVAL { 0 }

::= { wfNatAddressRangeEntry 6 }

wfNatAddressRangeType OBJECT-TYPE

SYNTAX INTEGER {

sourceAddrFilter(1),

translationPool(2),

domainSrcAddrFilter(3),

domainTransPool(4)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Denotes the type of address range being defined.

sourceAddrFilter: a range of IP addresses used to detect packets which need traditional NAT forwarding.

translationPool: for traditional NAT forwarding, a range of IP addresses from which translation addresses are picked.

domainSrcAddrFilter: a range of IP addresses used to detect domain specific packets which need domain specific NAT forwarding.

domainTransPool: for domain specific NAT forwarding, a range of IP addresses from which domain specific translation addresses are picked."

DEFVAL{ sourceAddrFilter }

::= { wfNatAddressRangeEntry 7 }

wfNatAddressRangeDomain OBJECT-TYPE

SYNTAX DisplayString

ACCESS read-write

STATUS mandatory

DESCRIPTION

"When wfNatAddressRangeType is set to domainSrcAddrFilter or domainTransPool, specifies the Address Domain Name that this address range is valid for, otherwise set to null."

::= { wfNatAddressRangeEntry 8 }

FIG. 12G

wfNatAddressRangeTransPool OBJECT-TYPE

SYNTAX INTEGER {
 inbound(1),
 outbound(2)
 }

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This attribute is only valid for the wfNatAddressRangeType as domainSrcAddrFilter(3). The value of this attribute decides where to get the translation address for this range from. This could be either the translation Pool defined for the inbound domain or the outbound domain for the packet in question."

DEFVAL{ outbound }

::= { wfNatAddressRangeEntry 9 }

wfNatAddressRangeStaticNextHop OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-write

STATUS mandatory

DESCRIPTION

"The IP address of the next hop of this range entry."

DEFVAL{ 0 }

::= { wfNatAddressRangeEntry 10 }

wfNatAddressRangeUnnumCct OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This Nat Address range over the unnumbered interface."

DEFVAL{ 0 }

::= { wfNatAddressRangeEntry 11 }

FIG. 12H

```

wfNatStaticMappingTable OBJECT-TYPE
    SYNTAX SEQUENCE OF WfNatStaticMappingEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "This table creates instances of pre-defined NAT translations."
    ::= { wfNatGroup 9 }

wfNatStaticMappingEntry OBJECT-TYPE
    SYNTAX WfNatStaticMappingEntry
    ACCESS not-accessible
    STATUS mandatory
    DESCRIPTION
        "A single original source address to translated address
        translation."
    INDEX { wfNatStaticMappingTransAddress,
            wfNatStaticMappingProtocol,
            wfNatStaticMappingTransPort }
    ::= { wfNatStaticMappingTable 1 }

WfNatStaticMappingEntry ::= SEQUENCE {
    wfNatStaticMappingDelete
        INTEGER,
    wfNatStaticMappingDisable
        INTEGER,
    wfNatStaticMappingOrigAddress
        IpAddress,
    wfNatStaticMappingTransAddress
        IpAddress,
    wfNatStaticMappingProtocol
        INTEGER,
    wfNatStaticMappingOrigPort
        INTEGER,
    wfNatStaticMappingTransPort
        INTEGER,
    wfNatStaticMappingInDomain
        DisplayString,
    wfNatStaticMappingOutDomain
        DisplayString,
    wfNatStaticMappingStaticNextHop
        IpAddress,
    wfNatStaticMappingUnnumCct
        INTEGER
}

```

FIG. 12I

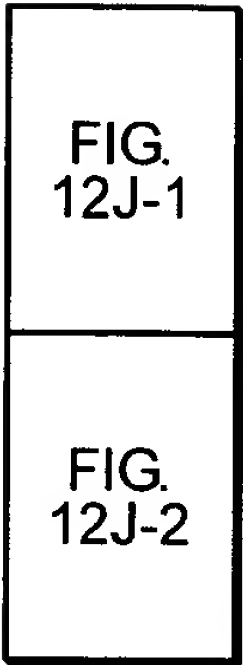


FIG.
12J-1

FIG.
12J-2

FIG. 12J

wfNatStaticMappingDelete OBJECT-TYPE

SYNTAX INTEGER {

created(1),

deleted(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Create/Delete parameter. Default is created. Users perform a set operation on this object in order to create/delete a static address translation entry."

DEFVAL { created }

::= { wfNatStaticMappingEntry 1 }

wfNatStaticMappingDisable OBJECT-TYPE

SYNTAX INTEGER {

enabled(1),

disabled(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Enable/Disable parameter. Default is enabled. Users perform a set operation on this object in order to enable/disable a static address translation entry."

DEFVAL { enabled }

::= { wfNatStaticMappingEntry 2 }

FIG. 12J-1

wfNatStaticMappingOrigAddress OBJECT-TYPE
SYNTAX IpAddress
ACCESS read-write
STATUS mandatory
DESCRIPTION
 "The original (un-translated) address of the translation."
 ::= { wfNatStaticMappingEntry 3 }

wfNatStaticMappingTransAddress OBJECT-TYPE
SYNTAX IpAddress
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The translated address of the translation."
 ::= { wfNatStaticMappingEntry 4 }

wfNatStaticMappingProtocol OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
 "The IP protocol of the translation. Example values are
 6 for TCP, and 17 for UDP."
 ::= { wfNatStaticMappingEntry 5 }

FIG. 12J-2



FIG.
12K-1

FIG.
12K-2

FIG. 12K

wfNatStaticMappingOrigPort OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"The original (domain specific) UDP or TCP port of the translation. This will only be relevant if the protocol is either UDP or TCP."

::= { wfNatStaticMappingEntry 6 }

wfNatStaticMappingTransPort OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The translated UDP or TCP port of the translation. This will only be relevant if the protocol is either UDP or TCP."

::= { wfNatStaticMappingEntry 7 }

wfNatStaticMappingInDomain OBJECT-TYPE

SYNTAX DisplayString

ACCESS read-write

STATUS mandatory

DESCRIPTION

"This attribute specifies the name of the address domain that this source translation shall be valid for. In other words, this translation shall only be valid for source addresses coming inbound from this domain."

DEFVAL { "private" }

::= { wfNatStaticMappingEntry 8 }

FIG. 12K-1

wfNatStaticMappingOutDomain OBJECT-TYPE**SYNTAX** DisplayString**ACCESS** read-write**STATUS** mandatory**DESCRIPTION**

"This attribute specifies the name of the outbound address domain that this translation will be valid for. In other words, this translation only applies to translations that will be forwarded out into this address domain."

DEFVAL { "public" }**::=** { wfNatStaticMappingEntry 9 }**wfNatStaticMappingStaticNextHop OBJECT-TYPE****SYNTAX** IpAddress**ACCESS** read-write**STATUS** mandatory**DESCRIPTION**

"The IP address of the next hop of this static entry."

DEFVAL{ 0 }**::=** { wfNatStaticMappingEntry 10 }**FIG. 12K-2**

wfNatStaticMappingUnnumCct OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
 "This Nat static translation over the unnumbered interface."
DEFVAL{ 0 }
::= { wfNatStaticMappingEntry 11 }

FIG. 12L

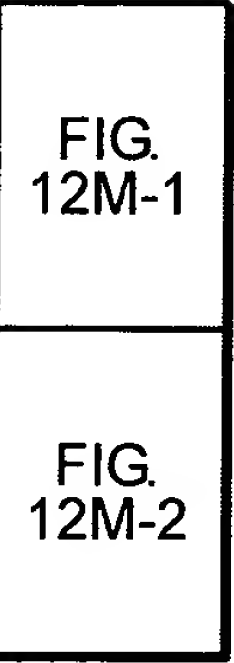


FIG.
12M-1

FIG.
12M-2

FIG. 12M

wfNatMappingTable OBJECT-TYPE

SYNTAX SEQUENCE OF WfNatMappingEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"This table defines the current set of address translations
that are in effect."

::= { wfNatGroup 10 }

wfNatMappingEntry OBJECT-TYPE

SYNTAX WfNatMappingEntry

ACCESS not-accessible

STATUS mandatory

DESCRIPTION

"A single original source address to translated address
translation."

INDEX { wfNatMappingTransAddress,
wfNatMappingProtocol,
wfNatMappingTransPort }

::= { wfNatMappingTable 1 }

FIG. 12M-1


```

WfNatMappingEntry ::= SEQUENCE {
    wfNatMappingOrigAddress
        IpAddress,
    wfNatMappingTransAddress
        IpAddress,
    wfNatMappingProtocol
        INTEGER,
    wfNatMappingOrigPort
        INTEGER,
    wfNatMappingTransPort
        INTEGER,
    wfNatMappingTxCount
        Counter,
    wfNatMappingRxCount
        Counter,
    wfNatMappingTimeout
        Counter,
    wfNatMappingMode
        INTEGER,
    wfNatMappingInDomain
        DisplayString,
    wfNatMappingOutDomain
        DisplayString
}

```

wfNatMappingOrigAddress OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The original (un-translated) address of the translation."

::= { wfNatMappingEntry 1 }

FIG. 12M-2



FIG.
12N-1

FIG.
12N-2

FIG. 12N

wfNatMappingTransAddress OBJECT-TYPE

SYNTAX IpAddress

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The translated address of the translation."

::= { wfNatMappingEntry 2 }

wfNatMappingProtocol OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The IP protocol of the translation."

::= { wfNatMappingEntry 3 }

wfNatMappingOrigPort OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-only

STATUS mandatory

DESCRIPTION

"When the translation is for a TCP connection, this denotes
the original TCP port number."

::= { wfNatMappingEntry 4 }

FIG. 12N-1

wfNatMappingTransPort OBJECT-TYPE**SYNTAX** INTEGER**ACCESS** read-only**STATUS** mandatory**DESCRIPTION**

"When the translation is for a TCP connection, this denotes
the translated TCP port number."

::= { wfNatMappingEntry 5 }**wfNatMappingTxCount OBJECT-TYPE****SYNTAX** Counter**ACCESS** read-only**STATUS** mandatory**DESCRIPTION**

"Number of packets forwarded by NAT using this translation."

::= { wfNatMappingEntry 6 }**wfNatMappingRxCount OBJECT-TYPE****SYNTAX** Counter**ACCESS** read-only**STATUS** mandatory**DESCRIPTION**

"Number of packets received by NAT using this translation."

::= { wfNatMappingEntry 7 }**FIG. 12N-2**



FIG.
120-1

FIG.
120-2

FIG. 120

wfNatMappingTimeout OBJECT-TYPE

SYNTAX Counter

ACCESS read-only

STATUS mandatory

DESCRIPTION

"The time in seconds since this translation entry was last used.

This is used to age out translation entries."

::= { wfNatMappingEntry 8 }

wfNatMappingMode OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-only

STATUS mandatory

DESCRIPTION

"This is the bit mask representing the type of this translation.

Each bit specifies the type as follows:

The translation could be only ONE of the following three...

0x01000000 - This translation is originated on this router,
i.e. this NAT router performed the translation.

0x02000000 - This translation is learned from the peer,
i.e. this translation was learned from the
peer using NAT Synchronization feature.

0x04000000 - This translation is owned,
i.e. it was originally learned from peer, but
this router received traffic which used this
translation.

...and only ONE of the following three.

0x00000010 - This translation is the STATIC translation.

0x00000020 - This translation is Dynamic(1 to 1) translation.

0x00000040 - This translation is N to 1 translation."

DEFVAL { 0 }

::= { wfNatMappingEntry 9 }

FIG. 120-1

wfNatMappingInDomain OBJECT-TYPE

SYNTAX DisplayString

ACCESS read-only

STATUS mandatory

DESCRIPTION

"This attribute specifies the name of the address domain that this source translation shall be valid for. In other words, this translation shall only be valid for source addresses coming inbound from this domain."

::= { wfNatMappingEntry 10 }

FIG. 120-2

```
wfNatMappingOutDomain OBJECT-TYPE
    SYNTAX DisplayString
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "This attribute specifies the name of the outbound address domain
        that this translation will be valid for. In other words, this
        translation only applies to translations that will be forwarded
        out into this address domain."
    ::= { wfNatMappingEntry 11 }
```

END -- Wellfleet-NPT-MIB

FIG. 12P